

Instructions for using a side mount phototube for the Berkeley Lab cosmic ray detector

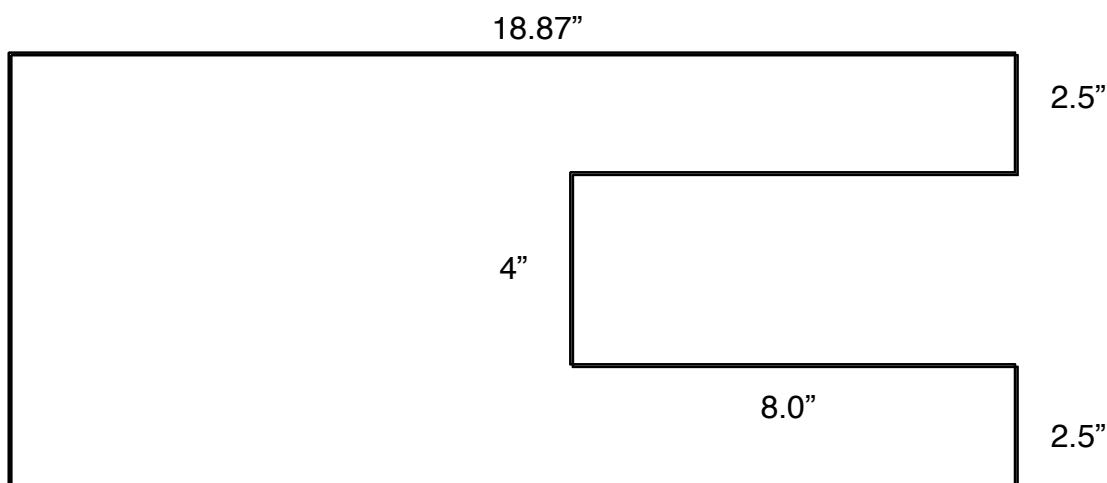
by Howard Matis
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It is possible to use a side mount phototube with the Berkeley Lab cosmic ray detector. We have used from Electron Tubes the 931B + PS1252/5F phototube and base. These items replace the P30CW5 phototube and base combination. To use this phototube and base no changes are needed to the electrical circuit.

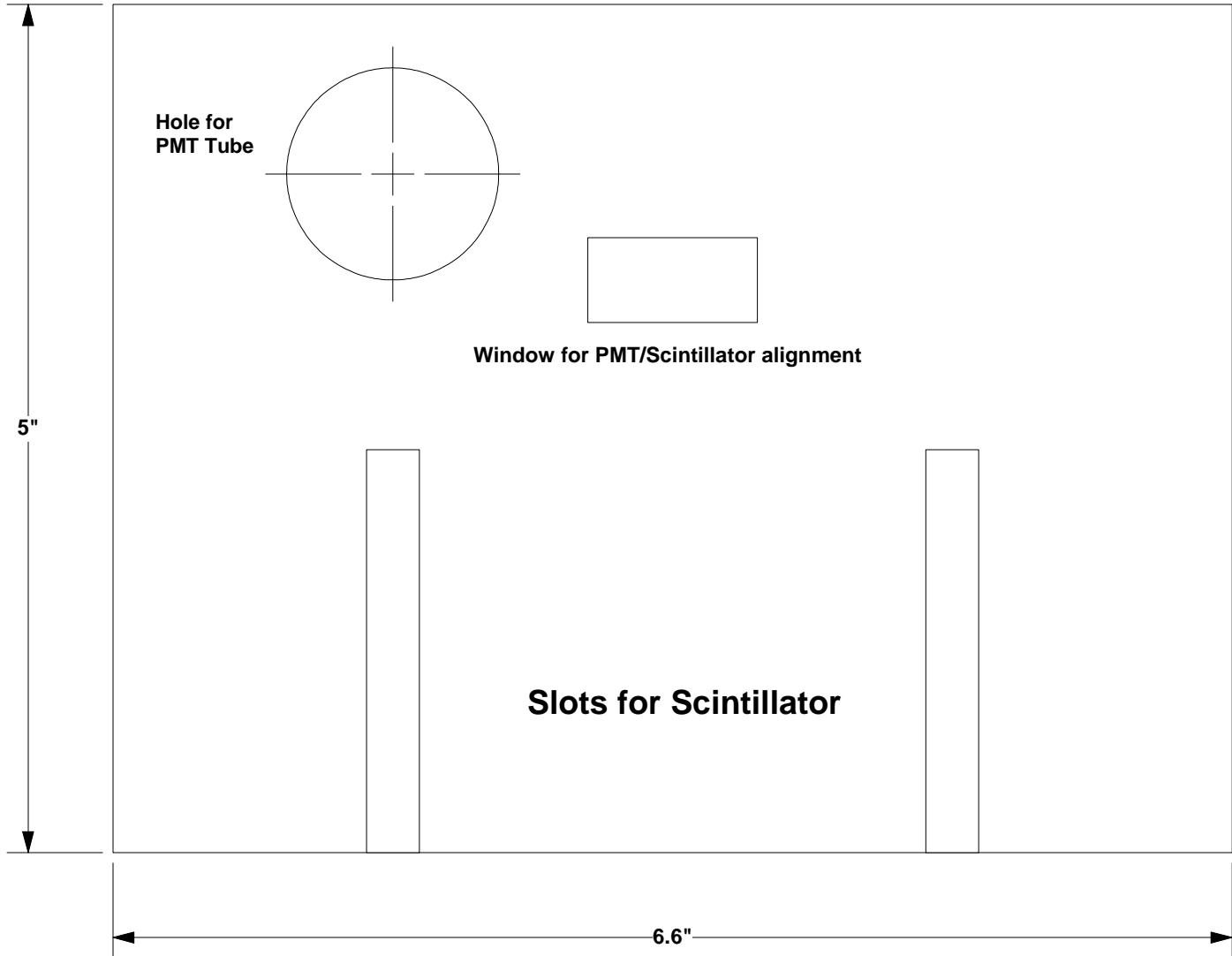
Several mechanical changes from our original design are needed to mount the phototube to the scintillators:

1. The phototube mounts at right angles to the scintillators. To hold these two items together, we use a small cylindrical tube (2" cardboard mailing tube). There is a hole for the photomultiplier (make the hole undersized so there is a tight fit) and a slot for the scintillator. The next page contains a template and instructions (courtesy of John Wolf from Berkeley Lab).
2. The Lucite front panel needs to be shortened. The new dimensions are shown in Figure 1. It is useful to drill a small hole so that a screwdriver can access the potentiometer in the phototube base. Figure 1 shows the revised dimensions.
3. The lower wooden support needs to be modified to match the Lucite front panel.
4. The phototube is now supported by the top or bottom of the box. Make sure that you do not tighten the clamp too hard as you might break the glass.

Figure 1. – Revised dimensions for the front Lucite Panel



Template for Cosmic Ray PMT/Scintillator Holder



Instructions:

1. Cut a 5" piece from a cardboard mailing tube (2" OD).
2. Cut out template and place over tube
3. Transfer 3 rectangles on paper template to cardboard tube with pins and cut out.
4. Using a compass, transfer center of 1 1/4" diameter circle to tube and cut out.
5. PMT tube fits snugly through 1 1/4" hole. Be sure active area (photo cathode) on PMT is facing cardboard tube end. The scintillator must be glued to this area.
6. Wrap the cardboard holder and the glued PMT/scintillator with many short pieces of 2" black paper tape to make it light tight.